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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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CHICAGO, IL 60606

EXAMINER

PRENTY, MARK V

ART UNIT	PAPER NUMBER
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2822

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19

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/262,657

Applicant(s)
FUKUNAGA

Examiner
Prenty

Art Unit
2822



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jan 8, 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4, 5, 7, 8, 10, 11, 13, 14, and 30-43 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 5, 7, 8, 10, 11, 13, 14, and 30-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 20) ☐ Other: _____

This Office Action is in response to the RCE filed January 8, 2002.

Claims 30-38 and 41-43 are rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With respect to independent claim 30, the specification does not describe first and second thin film transistors "wherein the semiconductor film of said second thin film transistor contains germanium at a higher concentration than [sic] the semiconductor film of said first thin film transistors and the semiconductor film of the first thin film transistors is not intentionally added with germanium," as recited in independent claim 30. Rather, the specification discloses that the semiconductor films of claim 30's first and second thin film transistors consist of silicon (Si) and silicon germanium (SiGe), respectively. See the specification at page 8, lines 13-21, for example.

Claims 31, 32 and 41 depend on independent claim 30 and are thus similarly rejected. Claim 31 is further rejected because the specification does not describe "wherein the semiconductor film of said plurality of first [sic] thin film transistors is not added with germanium while the semiconductor film of said second thin film transistor is added with germanium." Again, the specification discloses that the semiconductor films of claim 30's first and second thin film transistors consist of silicon (Si) and silicon germanium (SiGe), respectively. See the specification at page 8, lines 13-21, for example.

With respect to independent claim 33, the specification does not describe first and second thin film transistors "wherein said first semiconductor film contains

germanium at a higher concentration than said second semiconductor film and the second semiconductor film is not intentionally added with germanium,” as recited in independent claim 33. Rather, the specification describes first and second thin film transistors wherein one semiconductor film consists of silicon germanium (SiGe) and the other semiconductor film consists of silicon (Si). See the specification at page 8, lines 13-21, for example.

Claims 34, 35 and 42 depend on independent claim 33 and are thus similarly rejected. Claim 34 is further rejected because the specification does not describe “wherein said first semiconductor film is added with germanium while the second semiconductor film is not intentionally added with germanium.” Rather, the specification describes first and second thin film transistors wherein one semiconductor film consists of silicon germanium (SiGe) and the other semiconductor film consists of silicon (Si). See the specification at page 8, lines 13-21, for example.

With respect to independent claim 36, the specification does not describe first and second thin film transistors “wherein said first semiconductor film contains germanium at a higher concentration than said second semiconductor film and the second semiconductor film is not intentionally added with germanium,” as recited in independent claim 36. Rather, the specification describes first and second thin film transistors wherein one semiconductor film consists of silicon germanium (SiGe) and the other semiconductor film consists of silicon (Si). See the specification at page 8, lines 13-21, for example.

Claims 37, 38 and 43 depend on independent claim 36 and are thus similarly rejected. Claim 37 is further rejected because the specification does not describe “wherein said first semiconductor film is added with germanium while the second

semiconductor film is not intentionally added with germanium.” Rather, the specification describes first and second thin film transistors wherein one semiconductor film consists of silicon germanium (SiGe) and the other semiconductor film consists of silicon (Si). See the specification at page 8, lines 13-21, for example.

Claims 30-38 and 41-43 are rejected under 35 U.S.C. §112, first paragraph, because the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention.

With respect to independent claim 30, the specification is non-enabling for first and second thin film transistors “wherein the semiconductor film of said second thin film transistor contains germanium at a higher concentration than [sic] the semiconductor film of said first thin film transistors and the semiconductor film of the first thin film transistors is not intentionally added with germanium,” as recited in independent claim 30. Rather, the specification is enabling for claim 30’s first and second thin film transistors consisting of silicon (Si) and silicon germanium (SiGe), respectively. See the specification at page 8, lines 13-21, for example.

Claims 31, 32 and 41 depend on independent claim 30 and are thus similarly rejected. Claim 31 is further rejected because the specification is non-enabling for “wherein the semiconductor film of said plurality of first [sic] thin film transistors is not added with germanium while the semiconductor film of said second thin film transistor is added with germanium.” Rather, the specification is enabling for claim 30’s first and second thin film transistors consisting of silicon (Si) and silicon germanium (SiGe), respectively. See the specification at page 8, lines 13-21, for example.

With respect to independent claim 33, the specification is non-enabling for first and second thin film transistors “wherein said first semiconductor film contains

germanium at a higher concentration than said second semiconductor film and the second semiconductor film is not intentionally added with germanium,” as recited in independent claim 33. Rather, the specification enables first and second thin film transistors wherein one semiconductor film consists of silicon germanium (SiGe) and the other semiconductor film consists of silicon (Si). See the specification at page 8, lines 13-21, for example.

Claims 34, 35 and 42 depend on independent claim 33 and are thus similarly rejected. Claim 34 is further rejected because the specification is non-enabling for “wherein said first semiconductor film is added with germanium while the second semiconductor film is not intentionally added with germanium.” Rather, the specification enables first and second thin film transistors wherein one semiconductor film consists of silicon germanium (SiGe) and the other semiconductor film consists of silicon (Si). See the specification at page 8, lines 13-21, for example.

With respect to independent claim 36, the specification is non-enabling for first and second thin film transistors “wherein said first semiconductor film contains germanium at a higher concentration than said second semiconductor film and the second semiconductor film is not intentionally added with germanium,” as recited in independent claim 36. Rather, the specification enables first and second thin film transistors wherein one semiconductor film consists of silicon germanium (SiGe) and the other semiconductor film consists of silicon (Si). See the specification at page 8, lines 13-21, for example.

Claims 37, 38 and 43 depend on independent claim 36 and are thus similarly rejected. Claim 37 is further rejected because the specification is non-enabling for “wherein said first semiconductor film is added with germanium while the second

semiconductor film is not intentionally added with germanium.” Rather, the specification enables first and second thin film transistors wherein one semiconductor film consists of silicon germanium (SiGe) and the other semiconductor film consists of silicon (Si). See the specification at page 8, lines 13-21, for example.

Claims 1, 4, 7, 10, 13, 31, 34, 37 and 39 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claim 1 is incorrect in reciting “a second thin film transistor having a second active layer comprising silicon...wherein said second active layer is not intentionally added with germanium.” The specification discloses that the second thin film transistor’s active layer is silicon (Si).

Claims 4, 7, 10, 13 and 39 depend on independent claim 1 and are thus similarly incorrect.

Claim 31 is incorrect in reciting “wherein the semiconductor film of said plurality of first [sic] thin film transistors is not added with germanium while the semiconductor film of said second thin film transistor is added with germanium.” The specification discloses that claim 31’s first thin film transistor’s active layer consists of silicon (Si) and that claim 31’s second thin film transistor’s active layer consists of silicon germanium (SiGe).

Claim 34 is incorrect in reciting “wherein said first semiconductor film is added with germanium while the second semiconductor film is not intentionally added with germanium.” The specification discloses first and second thin film transistors wherein one semiconductor film consists of silicon germanium (SiGe) and the other semiconductor film consists of silicon (Si). See the specification at page 8, lines 13-

21, for example.

Claim 37 is incorrect in reciting "wherein said first semiconductor film is added with germanium while the second semiconductor film is not intentionally added with germanium." The specification discloses first and second thin film transistors wherein one semiconductor film consists of silicon germanium (SiGe) and the other semiconductor film consists of silicon (Si). See the specification at page 8, lines 13-21, for example.

Claims 2, 5, 11, 14 and 40 are rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. (United States Patent 5,614,733 cited in the Information Disclosure Statement filed April 23, 2001) together with King et al. (the *IEEE Transactions on Electron Devices* article submitted in the Information Disclosure Statement filed October 10, 2000).

The difference between Zhang et al. (see the entire patent) and the set of rejected claims is their complementary driver circuit transistors are formed in polycrystalline silicon and polycrystalline silicon germanium, respectively.

King et al. teach that it is advantageous to form complementary driver circuit transistors in polycrystalline silicon-germanium rather than polycrystalline silicon.

It would have been obvious to one skilled in this art to advantageously form Zhang et al.'s complementary driver circuit transistors (but not its pixel circuit transistors, which Zhang et al. disclose are on a different design footing than the driver circuit transistors), in polycrystalline silicon-germanium, rather than polycrystalline silicon, as taught by King et al.

Claims 2, 5, 11, 14 and 40 are thus rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. together with King et al.

Claim 8 is rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. (United States Patent 5,614,733 cited in the Information Disclosure Statement filed April 23, 2001, hereinafter Zhang et al. '733) together with King et al. (the *IEEE Transactions on Electron Devices* article submitted in the Information Disclosure Statement filed October 10, 2000) and Zhang et al. (United States Patent 5,648,277 cited in the Information Disclosure Statement filed March 4, 1999, hereinafter Zhang et al. '277).

The difference between the obvious Zhang et al. '733 / King et al. device and claim 8 is their second, matrix thin films comprise polycrystalline silicon and amorphous silicon, respectively.

Zhang et al. '277 teach forming second, matrix thin films from amorphous silicon (see its Fig. 6 disclosure).

It would have been further obvious to one skilled in this art to form the obvious Zhang et al. '733 / King et al. device's second, matrix thin film of amorphous silicon instead of polysilicon, as suggested by Zhang et al. '277.

Claim 8 is thus rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. '733 together with King et al. and Zhang et al. '277.

Claims 1, 4, 10, 13, 30-35, 39, 41 and 42, insofar as understood, are rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. (United States Patent 5,614,733 cited in the Information Disclosure Statement filed April 23, 2001) together with King et al. (the *IEEE Transactions on Electron Devices* article submitted in the Information Disclosure Statement filed October 10, 2000).

Specifically, the difference between Zhang et al. (see the entire patent) and the set of rejected claims is their complementary driver circuit transistors are formed in

polycrystalline silicon and polycrystalline silicon germanium, respectively.

King et al. teach that it is advantageous to form complementary driver circuit transistors in polycrystalline silicon-germanium rather than polycrystalline silicon.

It would have been obvious to one skilled in this art to advantageously form Zhang et al.'s complementary driver circuit transistors (but not its pixel circuit transistors, which Zhang et al. disclose are on a different design footing than the driver circuit transistors), in polycrystalline silicon-germanium, rather than polycrystalline silicon, as taught by King et al.

Claims 1, 4, 10, 13, 30-35, 39, 41 and 42 are thus rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. together with King et al.

Claims 7, 36-38 and 43, insofar as understood, are rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. (United States Patent 5,614,733 cited in the Information Disclosure Statement filed April 23, 2001, hereinafter Zhang et al. '733) together with King et al. (the *IEEE Transactions on Electron Devices* article submitted in the Information Disclosure Statement filed October 10, 2000) and Zhang et al. (United States Patent 5,648,277 cited in the Information Disclosure Statement filed March 4, 1999, hereinafter Zhang et al. '277).

The difference between the obvious Zhang et al. '733 / King et al. device and the set of rejected claims is their second, matrix thin films comprise polycrystalline silicon and amorphous silicon, respectively.

Zhang et al. '277 teach forming second, matrix thin films from amorphous silicon (see its Fig. 6 disclosure).

It would have been further obvious to one skilled in this art to form the obvious Zhang et al. '733 / King et al. device's second, matrix thin film of amorphous silicon

instead of polysilicon, as suggested by Zhang et al. '277.

Claims 7, 36-38 and 43, insofar as understood, are thus rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. '733 together with King et al. and Zhang et al. '277.

Applicant's arguments are not persuasive.

First, the applicant's remark in the first paragraph on page 6 of the amendment after final filed October 9, 2001 is incorrect. The applicant's invention "resides" in using silicon germanium (i.e., SiGe) semiconductor film, not "silicon doped with germanium," for selected thin film transistors of a semiconductor device, while using silicon (i.e., Si) semiconductor film for the remaining thin film transistors of the semiconductor device.

Furthermore, the applicant's argument in the paragraph bridging pages 6 and 7 of the amendment after final filed October 9, 2001 is not at all persuasive, because, although it purports to characterize the references and rejections, it simply glosses over the Zhang '733 and King et al. references, and grossly oversimplifies and/or mischaracterizes the rejections based thereon.

Finally, the applicant disingenuously "respectfully disagrees" with what the applicant purports to be "the Examiner's conclusions," again glossing over the references and rejections in the process. In any event, the applicant conspicuously fails to even substantively address, let alone rebut, any of the maintained 35 U.S.C. §103(a) rejections.

Registered practitioners can telephone examiner Prenty at (703) 308-4939. All other parties should telephone (703) 308-0956.